

Appl. No. 09/806,401
Amdt. Dated February 26, 2004
Reply to Office Action of August 26, 2003

REMARKS

The Office Action mailed on August 26, 2003 is acknowledged. Applicants request re-examination of the above-mentioned application in view of the above amendments and the following remarks.

Rejections Under 35 U.S.C. § 112, second paragraph

Claims 1-4 stand rejected under 35 U.S.C. § 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter regarded as the invention. With respect to claim 1, the Examiner specifically asserts that the terms "the component side" and "the bottom side" lack antecedent basis. The Examiner also alleges that the terms "the contact pads on the bottom side of the multilayer wiring," "the component level," and "the next assembly group" recited in claim 3 lack proper antecedent basis. Claims 2 and 4 stand rejected for depending from a rejected claim.

As set forth above, applicants have amended claims 1 and 3. In claim 1, applicants have corrected the antecedent basis of the term "component side" recited in the second line of the claim and the "bottom side" recited in the fourth line. Applicants have also added to claim 1 the phrase "a plurality of" in order to better describe the claim term "contact pads." Applicants believe this amendment corrects the antecedent basis issue associated with the term "contact pads" recited in line 2 of claim 3.

In claim 3, applicants have changed the claim term "component level" to "component side" in order to properly refer to the claim limitation recited in line 2 of claim 1. Similarly, applicants have added the word "higher" to the claim term "next higher assembly group level" in order to properly refer to the same claim term as recited in line 5 of claim 1.

With the above amendments, applicants believe the problems with the antecedent basis of all claim terms have been corrected. Accordingly, applicants believe the rejections to claims 1-4 under 35 U.S.C. § 112, second paragraph, have been traversed.

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Rejections Under 35 U.S.C. § 103(a)

Claims 1-4 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent 5,861,322 granted to Caillat in view of U.S. Patent Application 2002/0109218 filed by Akram. Specifically, the Examiner believes that from column 5, line 29 to column 6, line 43, Caillat teaches a multichip module comprising multilayer wiring having at least one IC component applied on the component side thereof with the module being unilaterally covered on the component side with a case and comprising contact pads on the bottom side constituting the bottom side of the module without additional wiring. The Examiner also believes that Caillat discloses the component side of the multilayer wiring adhering to the hermetic case with portions free from components, with the hermetic case formed by plastics overmolding with the wiring having a height of less than approximately 100 μ m, wherein the wiring is constituted by a sequence of structured metal planes electrically separated from each other by insulating layers between which electrical connections are purposefully established through vias. Furthermore, the Examiner also believes that Caillat discloses solderable material in the form of solder balls being applied to contact pads on the bottom side of the multilayer wiring electrically connected to the component level through vias for establishing contact with the next assembly group level.

The Examiner believes that Caillat does not appear to explicitly teach a hermetic case. However, the Examiner believes Akram does teach a hermetic case, or "underfill," and it would have been obvious to use hermetic underfill of Akram in Caillat because it would protect the component. Thus, the Examiner believes claims 1-4 are obvious under 35 U.S.C. § 103(b) in view of Caillat and Akram. Applicants respectfully disagree.

The Teachings of Caillat

In the least, Applicants disagree with the Examiner that Caillat discloses a resin material 134 which functions as a case. The underfill resin material 134 is included in Caillat provides a means of rigidly connecting chip 130 to interconnection substrate 101. (See Caillat, column 6, lines 20-22). Caillat includes a separate cover 136 that provides protection to the chip 130. (See Caillat, column 6, line 22).

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The Teachings of Akram

In the section entitled "BACKGROUND OF THE INVENTION," Akram discloses that "Glob top and underfill materials are often used to hermetically seal the flip chips on the substrate." (See Akram, ¶ [0004]). The underfill portion is generally disposed between the semiconductor chip and the printed circuit board. (See Akram, ¶ [0004]). Akram does explain that glob top materials do not have desirable thermal and electrical properties. (See Akram, ¶ [0005]). "Furthermore, the additions of glob materials can induce detrimental stresses that can cause catastrophic failures." (See Akram, ¶ [0005]). In the section entitled "DETAILED DESCRIPTION OF THE INVENTION," Akram discloses three assemblies of the present invention, each including a shield plate (numbered 322, 422 and 522 in each consecutive embodiment). (See Akram, ¶ [0022], ¶ [0023], ¶ [0024]).

The Combination of Caillat and Akram

As summarized above, the Examiner asserts that Caillat discloses all of the limitations of the present claims except a hermetic case. Therefore, the Examiner relies on Akram to supply this limitation and rejects the present claims under 35 U.S.C. § 103(a). In making this rejection, the Examiner states: "it would have been obvious to use the hermetic underfill of Akram as the underfill 134 of Caillat because it would protect the component."

A "determination of obviousness cannot be based on hindsight combination of components selectively culled from the prior art to fit the parameters of the patented invention." *ADT Corp. v. Lydall, Inc.*, 159 F.3d 534, 546, 48 U.S.P.Q.2d 1321, 1329 (Fed. Cir. 1998). Prior art references are properly combined only when there is a suggestion, teaching or motivation comes from the prior art references themselves. *C.R. Bard, Inv. v. M3 Systems, Inc.*, 157 F.3d 1340, 1352, 48 U.S.P.Q.2d, 1225, 1232 (Fed. Cir. 1998). In determining the issue of obviousness, one must look to the collective teachings of the references and to whether the hypothetical person of ordinary skill in the art, familiar with such teachings, would have found it obvious to make a structure corresponding to that

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which is claimed. *In re Keller*, 642 F.2d 413, 425, 208 U.S.P.Q. 871, 881 (CCPA 1981); *In re Sernaker*, 702 F.2d 989, 994, 217 U.S.P.Q. 1, 5 (Fed. Cir. 1983).

In the present instance, applicants believe neither Akram nor Caillat include a teaching, motivation or suggestion to combine the references in the manner suggested by the Examiner. Caillat teaches the utilization of a cover 136 to protect the substrate and chip. (See Caillat, column 6, line 22). In Caillat, the underfill is limited to rigidly connecting the substrate and chip. (See Caillat, column 6, lines 20-22). Similarly, the embodiments of the invention of Akram also disclose utilizing a shield plate (322, 422, 522) to protect the chip. (See Akram, ¶¶ [0022]-[0024]). In addition, the inventions of Akram also include an underfill encapsulate (328, 428, 528) disposed between the chip and the substrate. (See Akram, ¶¶ [0022]-[0024]). Thus, neither Caillat nor Akram disclose inventions including a hermetic case formed by plastic overmolding.

With respect to the prior art, Akram does disclose using underfill materials to hermetically seal the chips. (See Akram, ¶ [0024]). However, Akram clearly teaches away from doing so. Specifically, Akram explains that globs of underfill materials induce detrimental stresses that cause catastrophic failures. (See Akram, ¶ [0025]). Further, Akram also teaches that the globs of underfill materials have undesirable thermal and electrical properties. (See Akram, ¶ [0025]). Thus, contrary to the assertion of the Examiner, Akram does not teach using underfill materials to hermetically seal the chip. Rather, Akram directly teaches away from using underfill materials as a seal, and instead focuses on the inclusion of a seal plate to protect the chip.

The M.P.E.P. states that when applying 35 U.S.C. § 103, certain tenants of patent law must be adhered to, including the tenet that references must be considered as a whole and must suggest desirability, and thus the obviousness, of making the combination suggested by the Examiner. *See* M.P.E.P., page 2100-14. The Examiner is ignoring this tenant when considering the Akram reference. The Examiner, in considering the use of underfill materials to seal the chip, ignores that Akram, as a whole, teaches away from using underfill in this manner. Thus, the combination suggested by the Examiner combines the undesirable features of the prior art disclosed in Akram with the teachings of

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Caillat with no suggestion to do so. Applicants contend this is improper use of hindsight utilizing the present invention as a blueprint.

Accordingly, applicants believe, in the least, the combination of the prior art does not teach a hermetic case formed by plastics overmolding, as recited by claim 1 of the present application. Consequently, applicants believe that claim 1 and all claims depending therefrom are allowable over the combination of Caillat and Akram.

Conclusion

Applicants have amended claims 1 and 3. These claims now comply with the requirements of 35 U.S.C. § 112, second paragraph. Furthermore, as set forth in the above remarks, Applicants believe that the combination of Akram and Caillat do not disclose all of the limitations recited in claim 1. Accordingly, applicants believe all of the pending claims are now in condition for allowance, and respectfully request passage thereof.

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If necessary to effect a timely response, please consider this paper a request for an extension of time, and charge any shortages in fees, or apply any overpayment credits, to Baker & Daniels' Deposit Account No. 02-0387 (72262.70012). However, please do not include the payment of issue fees.

Respectfully submitted,


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I hereby certify that this correspondence is being deposited with the U.S. Postal Service as First Class Mail in an envelope addressed to: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450 on

February 26, 2004

Date


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